



2014

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Recommended Citation

Larson, Bradley (2014) "UnElided Basic Remnants in Germanic Ellipsis or: ÜBRIGE Arguments," *University of Pennsylvania Working Papers in Linguistics*: Vol. 20 : Iss. 1 , Article 20.
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Abstract

There are differing theories concerning the construction dubbed swiping by Merchant 2002. Some theories predict that the inverted preposition/wh-word order characteristic of swiping is idiosyncratic to prepositions and wh-words in particular and does not generalize to other elements. Other theories predict that swiping is merely a particular instantiation of a generalizable possibility for inverted word orders under ellipsis. In this paper I provide evidence for this latter type of theory by showing that the characteristics of swiping extend beyond prepositionals and wh-words. The generalization is that whatever can extrapose and be extracted from can enter into a swiping like construction.

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Bradley Larson

1 Basic Goals

In this paper I seek to determine what is going on with examples like (1) seen below. Here we see that the normal English word order, wherein prepositions live up to their name, is altered. The preposition *to* appears to the right (or after) its object. This sort of construction has been dubbed Swiping (an acronym for Sluiced Wh-word Inversion with Prepositions In Northern Germanic) by Merchant (2002) and I will follow this usage here.

- (1) Dana was talking, but I don't know **who to**.

The example in (1) runs counter to our normal expectations concerning prepositions, and the question arises: Is swiping an idiosyncratic possibility for prepositions only or is it an instance of something more general? There have been two camps on the topic more or less. Ross 1969, Merchant 2002, Richards 1997, van Craenenbroeck 2004, and Hartman and Ai 2007 in effect argue that swiping is particular to prepositions whereas Kim 1997, Nakao, Ono, and Yoshida 2007, Hasegawa 2007, and Larson 2011 predict that swiping ought to generalize beyond prepositions.

In this paper I provide evidence supporting this second view. I show that more than prepositions can undergo what looks like swiping. Any element that is optionally null, indefinite, and extraposable can be involved in swiping. In short, this will include certain gerundive and infinitival clauses in addition to preposition. Examples of these can be seen in (2) and (3) below.

- (2) Dana was caught, but I don't know **what doing**.
(3) Dana was eager, but I don't know **what to do**.

In the above examples there is a wh-word that appears outside of its base position and I posit that it has undergone the same sort of operations as the wh-word in (1) above. But before getting into this idea, let's first take a look at previous accounts of swiping.

2 Current Analyses

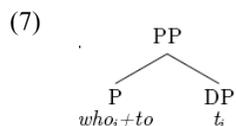
2.1 Head Movement Analyses

Merchant 2002 proposes that the wh-word in swiping examples has undergone head-movement at PF such that it incorporates into its selecting preposition. For a sentence like in (1), the prepositional phrase pied-pipes to the left periphery. This is shown in (4) below. After this the IP undergoes deletion such that only the pied-piped prepositional phrase remains overt. This is shown in (5) below. Then, at PF, the wh-word head-moves to incorporate into the preposition head. This is shown in the trees in (6) and (7).

- (4) [to who]_i Dana was talking t_i

- (5) [to who]_i ~~Dana was talking~~ t_i

- (6)
-
- ```
graph TD
 PP[PP] --- P[P]
 PP --- DP[DP]
 P --- to[to]
 DP --- who[who]
```



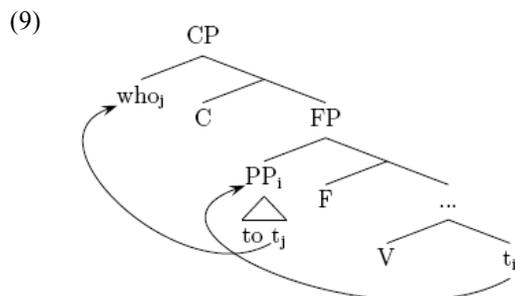
This allows us to capture the fact that only head-like wh-words can under swiping: only they can undergo head movement. When more structurally complex wh-words are used, the result is unacceptable as seen in (8) below.

(8) \*Dana was talking, but I can't remember which person to

There are other interesting aspects to this analysis, but for our purposes here it is most important to note that this approach to swiping requires that it only be possible with prepositions. It could in principle be modified so as to allow in such things as the gerundives and infinitivals mentioned above. But as we will see in subsequent sections, this would lead to the head-movement analysis to make incorrect predictions.

## 2.2 Sub-extraction Analyses

Another approach to swiping involves sub-extraction of the wh-word out of the prepositional phrase in the syntax. Such an analysis has been proposed by van Craenenbroeck 2004 and Hartman and Ai 2007. They posit that the prepositional phrase first moves to a functional projection in the left periphery. Following this, the wh-word sub-extracts and moves to the specifier position of C. This is sketched in (9) below.



Following this movement, the IP is obligatorily elided. This approach also predicts that swiping is idiosyncratic to prepositions. Only elements that can pied-pipe to the left periphery can sub-extracted out of and in turn effect swiping. In English, as we will see below, only prepositional phrases can undergo this pied-piping.

## 2.3 Extraposition Analyses

Extraposition is yet another approach to swiping and has been promoted by Kim 1997, Nakao, Ono, and Yoshida 2006, Hasegawa 2007, and Larson 2011. Under such analyses, the wh-word and the preposition are structurally very distant from one another and only superficially local. An example like (1), repeated here as (10) would have an underlying structure like that in (11) be derived in the following way. First the prepositional phrase extraposes to the right. This is shown in (12). This is followed by traditional wh-movement of the wh-word to the left periphery. This is shown in (13). Finally, as shown in (14), the IP is deleted. What remains are the wh-word and the preposition.

(10) Dana was talking, but I don't know who to.

- (11) Dana was talking, but I don't know who ~~Dana was talking~~ to.  
 (12) [Dana was talking  $t_i$ ] [to who]<sub>i</sub>  
 (13) [who<sub>j</sub> [Dana was talking  $t_i$ ] [to  $t_j$ ]<sub>i</sub>  
 (14) [who<sub>j</sub> [~~Dana was talking  $t_i$~~ ] [to  $t_j$ ]<sub>i</sub>

I will explicate this approach more thoroughly shortly, but for our purposes it is sufficient to note that this approach does not predict that swiping is idiosyncratic to prepositions. Any element that can extrapose and that can be extracted from should in principle be able to undergo swiping. This turns out to be more elements than just prepositions.

It is this third sort of analysis that I will be arguing for in this paper. In the next section I will lay out some descriptive background on the construction.

### 3 Background on Swiping

Swiping is a sub-type of sprouting (following Rosen 1976) which in turn is a sub-type of sluicing. Compare the instance of normal sluicing in (15) with the sprouting example in (16). In normal sluicing, the wh-word that evades deletion corresponds to an overt indefinite nominal in the antecedent sentence. In (15) this is *something*. This contrasts with the sprouting example in (16) where there is no overt indefinite, but rather a covert one.

- (15) Dana was eating something, but I can't remember what.  
 (16) Dana was eating, but I can't remember what.

As Rosen argues, swiping necessarily relies on sprouting. This can be seen in the differing acceptability between swiping examples in (17) and (18)

- (17) Dana was talking, but I can't remember who to.  
 (18) \*Dan was talking to someone, but I can't remember who to.

Note also that the null prepositional argument that the swiped prepositional phrase corresponds to must be interpreted as an indefinite. Take the example in (17). This example of sprouting is acceptable because the sentence *Dana was talking* can imply that Dana was talking *to someone*. This contrasts with sentences like in (19) which have implied definite arguments.

- (19) Dana applied.

The example above means that Dana applied to a particular definite thing, known to both interlocutors. Prepositional phrases corresponding to this null argument cannot undergo swiping as shown in example (20).

- (20) #Dana applied. Do you know what to/for?

These constraints will allow us to explore the generalizability of swiping in the next section. We will see that more than just prepositional phrases can be null and indefinite.

### 4 Additional optionally null indefinite elements

As noted in the previous section, null arguments that correspond to overt prepositional phrases can feed swiping. Antecedent sentences like (21) allow for swiping constructions like in (22).

- (21) Dana was talking.  
 (22) What about?

This is predicted, of course, by each of the previous analyses. However, for both the head movement account and the sub-extraction account, prepositional phrases are the limit of the construction. Merchant's head movement account is tailored to prepositions and any larger element should block the head movement of the *wh*-phrase. That is, if the *wh*-word were forced to move over another head it would run afoul of the head movement constraint (see Travis 1984). The sub-extraction analysis of van Craenenbroeck and Hartman and Ai only holds for pied-pipable elements, which in English is just prepositional phrases.

This contrasts with the extraposition analysis. As long as the element is extraposable and can otherwise adhere to the constraints on sprouting, it should be possible to swipe. Many more things can extrapose in English than can be pied-piped and in this section we will investigate some instances that extend beyond prepositional phrases.

Below are two candidates for an extension of swiping. Certain gerundives and infinitivals share the relevant properties. They are optionally null and when null, they are interpreted as indefinites. In (23), the sentence can imply that Dana was caught *doing something*. In (24), the sentence can imply that Dana was eager *to do something*.

- (23) Dana was caught.
- (24) Dana was eager.

Since these two types of examples comport with the independent constraints on sprouting they will allow us to distinguish between the theoretical options. With respect to the head movement account, these arguments (*doing something* and *to do something*) should not be able to undergo swiping as they would be too large for head movement to take place across.

Second, these types of elements cannot pied-pipe or otherwise move to the left periphery. As such, the sub-extraction account would predict that swiping cannot be involved here. This is shown below. In contrast with prepositional phrases, these gerundives and infinitivals cannot be pied-piped in a *wh*-question:

- (25) \*Doing what was Dana caught?
- (26) \*To do what was Dana eager?

Similarly, these gerundives and infinitivals cannot be involved in other A-bar relations like clefting, as shown in (27) and (28) (example (28) taken from Emonds 1972) and topicalization as shown in (29) and (30).

- (27) \*It was stealing my money that she caught him.
- (28) \*It was to report on time that we failed.
- (29) \*Stealing apples, Dana was caught.
- (30) \*To run away from home, Dana was eager.

These each contrast with prepositional phrases which can pied-pipe, cleft, and undergo topicalization:

- (31) About what were you speaking?
- (32) It was about Ivy's cat that Dana was talking.
- (33) About Dana's cat, Ivy was talking.

So the sub-extraction accounts would predict that these should not be able to swipe. For the extraposition account, these elements should be able to extrapose in order to also potentially feed swiping. As seen below, it is the case that these elements can extrapose:

- (34) Sal was caught yesterday doing something wrong.
- (35) Sal was eager yesterday to do something exciting.
- (36) Sal was talking yesterday to someone.

In sum, only the extraposition analysis would predict that these gerundives and infinitivals

should be able to undergo swiping just like prepositional phrases. In the next section we will see whether or not they in fact can.

## 5 Generalized Swiping

Gerundives and infinitivals of the sort introduced above share all of the characteristics that the extraposition account predicts to be conditions on swiping. Shown below, it seems that these elements can in fact undergo swiping:

- (37) a. Sal was caught, but I can't remember what doing.  
 b. Sal was caught last night. Really? What doing?  
 (38) a. Sal was eager, but I can't remember what to do.  
 b. Sal was eager last night. Really? What to do?

The above examples can be made to sound more natural when the *wh*-word is involve in a clefting construction as well. This is shown below:

- (39) Sal was talking, but I can't remember who it was to.  
 (40) Sal was caught, but I can't remember what it was doing.  
 (41) Sal was eager, but I can't remember what it was to do.

In sum, swiping is possible outside of prepositional phrases. It generalizes to: First, elements that can go **UnElided** in the sense that they can evade ellipsis. Second, elements that are **Basic** in the sense that they can optionally remain implicit in the antecedent. Third, elements that are **Remnants** out of which *wh*-words can move. This is possible **In Germanic Ellipsis** constructions and arguments that can undergo swiping can be called **ÜBRIGE** (German for 'leftover') arguments.

### 5.1 Extraposition Account Predictions

This sort of generalization is correctly predicted by the extraposition account and none of the other accounts. Further, we can expand on the predictions made by the extraposition account.

First, since extraposition is a prerequisite for swiping, it should be predicted that sub-parts of the *übrige* elements that cannot extrapose should also not be able to feed swiping. That is, if the first move is not grammatical, subsequent movements that would affect a swiping-like result should result in an unacceptable sentence. In (42), it is shown that it is not possible to extrapose the object of the gerundive to the exclusion of the verb itself. As such, any subsequent *wh*-movement from that extraposed position should result in a bad sentence as sketched in (43).

- (42) \*Sal was caught doing yesterday [something wrong]  
 (43) \*What<sub>i</sub> Sal was caught doing ~~t<sub>i</sub>~~ yesterday ~~t<sub>i</sub>~~

As such, it should not be possible to have an antecedent sentence like (44) with a lone *wh*-word being sluiced. This is the case as shown in (45).

- (44) Sal was caught.  
 (45) \*but I can't remember what (it was) ~~Sal was caught doing~~

This also holds for the infinitival version. It is not possible to extrapose to the exclusion of *to* as shown in (46). As predicted, swiping examples wherein the *to* is elided are unacceptable:

- (46) \*Sal was eager to ~~t~~ yesterday [do something exciting]  
 (47) \*Sal was eager, but I can't remember what ~~Sal was eager to~~ ~~t~~ do ~~t~~.  
 (48) \*Sal was eager, but I can't remember what do.

Further, in some languages, preposition stranding is not licit. Take the German example in (49) for instance.

- (49) \*Wem hat Sal mit gesprochen?  
 who.dat has Sal with spoken  
 ‘who did Sal speak with?’

Prepositional phrases as such in German fail to be extracted from and this precludes them from feeding swiping. This however does not hold for every German structure and in fact infinitivals can be extracted from as shown in example (50) below. Further, the infinitival in question is optionally null as seen in (51), is interpreted as indefinite, and can be extraposed as seen in (52).

- (50) Was war Sal bereit zu machen?  
 what was Sal ready to do  
 ‘What was Sal ready to do?’  
 (51) Sal war bereit (etwas zu machen).  
 Sal was ready something to do  
 ‘Sal was ready to do something’.  
 (52) Sal war bereit gestern etwas zu machen.  
 Sal was ready yesterday something to do.  
 ‘Sal was ready yesterday to do something.’

This optionally null German argument, as opposed to prepositional phrases, meets the conditions for being able to swipe under the extraposition account. Shown in (53), it is possible for it to undergo swiping. That is, swiping holds utterly independently from prepositional phrases.

- (53) Sal war bereit, aber ich hatte keine Ahnung was zu machen.  
 Sal was ready but I had no idea what to do  
 ‘Sal was ready, but I had no idea what (it was) to do.’

In this section we have seen that the extraposition account makes the correct predictions with respect to what can and cannot undergo swiping. Swiping is independent of prepositional phrases can occur so long as the relevant conditions are met. That is, swiping should not be seen as a specific constructions but rather the result of otherwise licit operations. In the next section I explore one final extension to this view of swiping.

## 6 Swiping Further Generalized

A question arises: If swiping is so generalizable, why does it only extend to wh-words? This seems like a fair assumption given the stark differences in acceptability between the swiping example in (54) that involves a wh-word and the swiping example in (55) that involves a definite noun phrase.

- (54) Dana was talking, but I can’t remember who to.  
 (55) \*Dana was talking. Yeah, Ivy to.

The extraposition account as it currently stands seems to make the false prediction that (55) should be acceptable. If it is truly the case that swiping specially requires wh-words, then a deeply generalized and explanatory theory will not be possible.

However, there may be a way to characterize the traditional swiping sentences so that the distinction between (54) and (55) falls out. Note that in the example in (54) there is a degree of semantic parallelism between the antecedent clause and the swiping clause. Following Johnson 2001, we can describe the meaning in the antecedent clause as involving existential quantification over a variable as sketched in (56). In the swiping sentence there is a parallel operator variable relation between the moved wh-word and its trace. This is shown in (57).

- (56)  $\exists x$  Dana was talking to  $x$   
 (57) but I can't remember **for what**  $x$  Dana was talking to  $x$

This parallelism does not hold in the example in (55). In the swiping sentence there is no analogous long-distance relation:

- (58)  $\exists x$  Dana was talking to  $x$   
 (59) Dana was talking to Ivy

Perhaps there is a way to achieve a sort of parallelism that would allow non-wh words to undergo swiping. Were this the case, we could add another generalized condition on swiping to the list already created.

One way to do this would be to topicalize a non-wh element in the antecedent clause and then have a contrasting non-wh word in the potential swiping sentence. Examples of this are shown below in (60–62). These are acceptable and seem to be evidence of swiping extending not just beyond prepositional phrases but also beyond mere wh-words. The intended interpretation of these sentences is given as the 'b' examples. For the best effect these sentences should be read as if you were correcting someone for getting the facts wrong:

- (60) a. Mary, Dana was talking TO; Ivy ABOUT.  
       b. Mary, Dana was talking TO; Ivy, Dana was talking ABOUT.  
 (61) a. Mary, Dana was caught KICKING; Ivy HITTING.  
       b. Mary, Dana was caught KICKING; Ivy, Dana was caught HITTING.  
 (62) a. Mary, Dana was eager to KICK; Ivy, HIT.  
       b. Mary, Dana was eager to KICK; Ivy, Dana was eager to HIT.

In short, it seems that swiping may generalize to all A-bar dependencies given the correct conditions.

## 7 Conclusion

In this paper I have argued that swiping is not an idiosyncratic construction that only involves wh-words and prepositional phrases. Instead, I have noted that swiping can involve larger structures so long as they can evade ellipsis, are optionally and indefinite, and can extrapose. Further, it seems that there might be a sort of parallelism requirement on the resulting structure with respect to its antecedent sentence.

These results make analyses in which only prepositions can undergo swiping less satisfactory accounts. Accounts that instead rely on extraposition to feed swiping capture the data more fully.

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